NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF APPLIED SCIENCE

DEPARTMENT OF APPLIED CHEMISTRY

INDUSTRIAL ORGANIC CHEMISTRY III
SCH 4215

FOR SCH STUDENTS ONLY

Second Semester Examination Paper

MAY 2016

This examination paper consists of 4 pages

Time Allowed: 3 hours

Total Marks: 100

Special Requirements: NONE

Examiner's Name: DR C T PAREKH

INSTRUCTIONS

1. **Answer all questions from Section A and any three from Section B. Section A carries 40 marks and each question in Section B carries 20 marks.**

2. **Show mechanism, chemical steps or synthesis by means of curved arrows.**

MARK ALLOCATION

QUESTION	MARKS
1.	**40**
2.	**20**
3.	**20**
4.	**20**
5.	**20**
TOTAL	**100**

SECTION A

1. (a) Write definition of a drug according to WHO. (4 Marks)

(b) Adrenal cortex secretes the hormone called cortisone. Draw the structure of cortisone and explain function of this hormone. (4 Marks)

(c) What is the name of the first synthetic dye? Who synthesised the dye? (2 Marks)

(d) Suggest therapeutic uses for the following drug: (do not repeat the class).

(i) paracetamol (ii) amoxicillin (iii) digoxin
(iv) ranitidine (v) albuterol (vi) prozac (6 Marks)

(e) Name the microbial organism used in the industrial fermentation of lactic acid. (2 Marks)

(f) What do you understand by the term bioavailability? (3 Marks)

(g) What do you understand by ***"first pass effect"***? (4 Marks)

(h) What causes the deficiency of Vitamin C? Draw the structure of Vitamin C. (4 Marks)

(i) Give three ways of administering a drug to a patient. (3 Marks)

(j) What do you understand by (i) pharmacology and (ii) pharmacodynamic agents. (4 Marks)

(k) Write the chemical equation for the reduction of nitro group, using Bechamp method. (2 Marks)

(j) What is the effect of sedative drug and an antidepressant drug. (2 Marks)

SECTION B:

2. (a) Draw the labelled schematic diagram for the manufacture of polypropene. (10 Marks)

(b) Write reaction mechanism for the synthesis of anthraquinone from phthalic anhydride. Use reagents of your choice. Use curved arrows to illustrate the mechanism. (5 Marks)

(c) Explain what the letters A, E, M, D and Z stand for in the dye industry. (5 Marks)

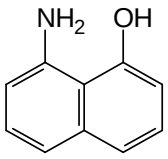
3. (a) The following compounds are classified as natural products. Draw the structure of the compound and also indicate the name of the plant from which it is derived.

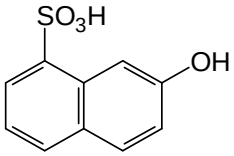
(i) quinine

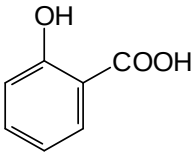
(ii) morphine (4x2 Marks)

(b) Write two synthetic methods for the manufacture of phthalic anhydride. Use reagents of your choice. (6 Marks)

(b) State condition(s) and indicate the position by an arrow where the following intermediate couple during dye manufacturing. Also indicate wherever possible where the first coupling will take place.

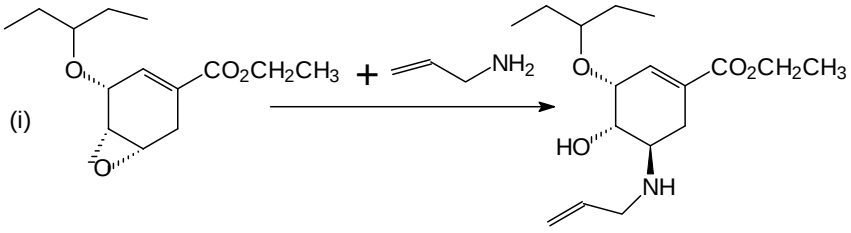
(i) 

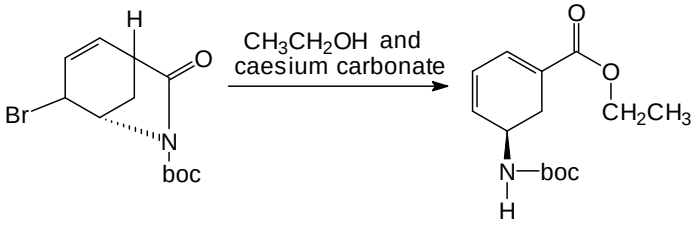
(ii) 

(iii) 

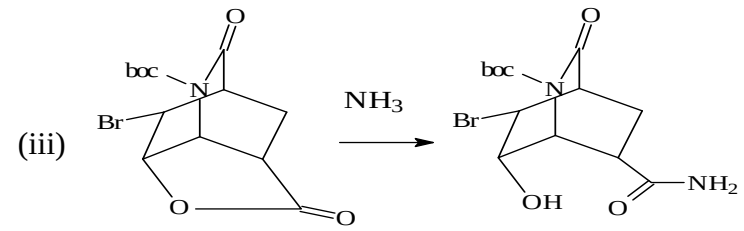
(6 Marks)

4. (a) Swine flu is caused by a virus and there are two anti-viral drugs that are available for the treatment of swine flu. (i) oseltmivir-phosphate (Tamiflu) and (ii) zanamivir (relenza). Among these two drugs Tamiflu is widely prescribed. There are two to three pathways to synthesise this drug such as Corey et al synthesis, Fukuyama synthesis and Sibasaki synthesis, synthesis from natural product shikimic acid etc. they used different starting raw material to produce Tamiflu. You are given the following steps from different syntheses. Write reaction mechanism for each of them. (Use curved arrows for movement of electrons).

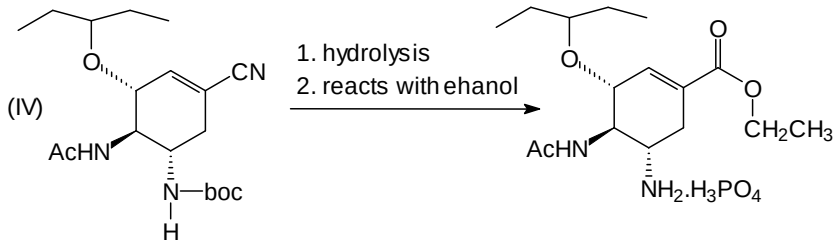
(i) 

(ii) 

(iii)

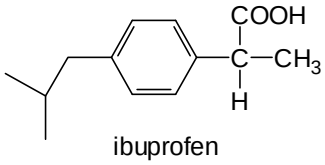


(IV)



(12 Marks)

(b) Outline the synthesis of ibuprofen from isobutylbenzene. Use reagents of your choice.



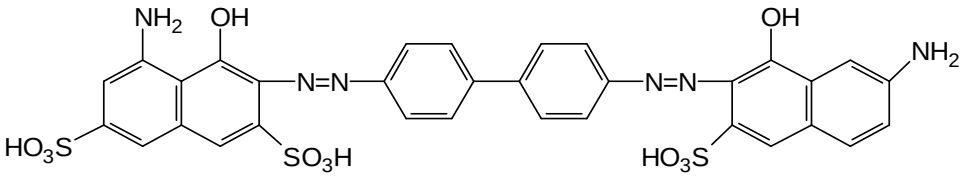
ibuprofen

(8 Marks)

5. (a) Aspirin is an analgesic drug which is available over the counter at pharmacies and many supermarkets. Outline the synthesis of aspirin from phenol. Use reagents of your choice. Write reaction mechanism for one of the steps which includes Kolbe-Schmitt reaction. (6 Marks)

(b) Explain why excess acid is added to phenylamine prior to diazotisation. Use chemical equations for your answer. (6 Marks)

(c) Write free components for the following dye. Write reaction mechanism step by step to synthesise the dye. Indicate Winther's formula for it.



(8 Marks)

End of question Paper!!!